"BAT BOOSTER PROGRAM"

TEACHER'S GUIDE

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Teacher's Activity Guide

The Teacher's Activity Guide is meant to supplement the Wild Resource Conservation Fund's video "Season of the Bat". The video presents basic bat information which will form the foundation of knowledge about Pennsylvania's bats for the students. The guide offers various projects with the intent of stimulating student interest and learning.

Many projects are quite detailed in an attempt to display their potential for student involvement. We realize many demands are placed on today's educators, making time and finances scarce. Should this be the case, teachers are encouraged to alter the formats to best suit their needs.

The development of the "Bat Booster Program" was funded by the Wild Resource Conservation Fund of Pennsylvania.

How to use the Bat Booster Program

The Bat Booster Program was designed for grades four through six *. It provides an interdisciplinary approach utilizing language arts, science, history, music, drama, and art, etc. The following is a suggested method for project utilization:

1. Put up poster to stimulate interest

2. Show "Season of the Bat" video

3. Distribute the bookmark to students
   - A. Ask which bat is displayed (the red bat)
   - B. Call attention to reading list on reverse side
   - C. Tell which of those books are available in your school's library

4. Show the "Pass the Torch of Knowledge" certificate and explain that student must teach any adult at least three facts about bats
   - A. Have the adult list the three facts and sign certificate
   - B. Return completed certificate to teacher
     1. Teacher will record completion by that student on provided record sheet
     2. Return certificate to student

5. Explain to students what must done to obtain their Bat Booster Button
   - A. Pass the included test (70 % correct answers) on the information contained in "Season of the Bat"
   - B. Bring a signed "Pass the Torch of Knowledge" certificate to the teacher
   - C. Participation, to the satisfaction of the teacher, in erection of class bat box
   - D. Participation in Bat Booster activity which the teacher elects to utilize

6. Show "Season of the Bat" again. Explain there will be a 20 question test

7. Give the test and record students scores on provided record sheet

8. Begin and complete the class bat box
   - A. Ask for room parent help
   - B. Letter sent home to parents
     1. Expectations
     2. Possible areas of sharing
   - C. Record student participation on provided record sheet

9. Choose and complete at least one of the offered activities via
   - A. Teacher selection
   - B. Class vote
   - C. Record student participation on provided record sheet

10. Award the Bat Booster Buttons
    - A. Teacher awards them
    - B. Students design awards program
      1. School is invited - assembly
      2. Parents are invited

11. Complete and mail Bat Booster Program evaluation form

*NOTE: This program can be completed by several classes or grade levels with each class selecting their own activity from the teacher's guide

TEACHER: _____

ACTIVITY:

STUDENT:

This is an example of a letter which, if sent home to parents at the begining of the project, may result in increased parental involvement

Dear Parent,

To help your child learn more about our world, we are going to study Pennsylvania's bats. The students will see a video about our bats, entitled "Season of the Bat," which has been produced by the Wild Resource Conservation Fund. They will take a 20 question test on the information contained in the video. They will be asked to teach an adult three facts about bats that they learned from the video. The students will be helping to dispel myths and folkiore about bats.

The second activity in which they will be asked to participate is the building and erection of a class bat box. They will also have the opportunity to participate in a "fun" class activity relating to bats. Students will then be awarded their Bat Booster Buttons.

Please support your child's involvement in this new learning experience. We welcome your help. Parents wishing to volunteer their skills may call your child's school.

Sincerely,

BASIC BAT TEST

1.) Baby bats, born in the spring, are called:

A.) kits
B.) pups
C.) nestlings
D.) cubs

2.) Which of the following is true about bats? They are:

A.) mice with wings
B.) birds
C.) flying mammals
D.) reptiles

3.) How many insects can a bat eat in one hour?

A.) 10
B.) 10,000
C.) 50
D.) 500

4.) Bats, staying in Pennsylvania, spend the winter in which of the following conditions?

A.) a coma
B.) hibernating
C.) sleeping
D.) sleepernating

5.) Which of the following do Pennsylvania bats eat?

A.) insects
B.) birds
C.) fruits
D.) fish

6.) When you find a bat in the house you should:

A.) hide under the couch
B.) get a tennis racket and kill the bat
C.) open the window so the bat can fly out
D.) call 911

7.) If you are bitten by a bat or any animal you should:

A.) place a Band-aid over the bite
B.) never tell anyone you were bitten because they will be mad at you
C.) tell a wildlife or health authority
D.) wait two weeks, then tell a friend

8.) Mist nets are used for which of the following?

A.) capturing bats for examination
B.) putting on plants to catch dew and mist
C.) badminton
D.) capturing gorillas in the mist

9.) The method used by Pennsylvania bats to find food is called:

A.) binocular vision
B.) smell
C.) heat sensing
D.) echolocation

10.) Which of the following is Pennsylvania's most common bat:?

A.) big toothed bat
B.) big brown bat
C.) red bat
D.) little brown bat

TRUE AND FALSE	CIRCLE	ANSWER
1.) Handling a sick or injured bat with your bare hands is OK.	T	F
2.) Some kinds of bats migrate in winter.	T	F
3.) Bats give birth to live young.	T	F
4.) All bats carry rabies.	T	F
5.) Many Pennsylvania bats eat fruits and vegetables.	T	F
6.) Bats are active at night.	T	F
7.) Bats are actually birds.	T	F
8.) Bats are blind.	T	F
9.) Most bats hibernate in caves.	T	F
10.) Bats usually attack people.	T	F

BAT TEST

1.) In China, bats symbolize five aspects of life. Which of the following is correct?

A.) health, freedom,wisdom, good death, pursuit of happiness
B.) security, good luck, prosperity, wealth, happiness
C.) health, wealth, happiness, peaceful death, longevity
D.) birth, child-hood, teen years, middle age, death

2.) Which of the following is utilized by Pennsylvania bats in food gathering?

A.) binocular vision
B.) heat sensing
C.) the force
D.) echolocation

3.) "Hand wing" is the meaning of the scientific order of bats. Which of the following is the correct name for this order?

A.) Cycloptera
B.) Chiroptera
C.) Archeopterix
D.) Chyropterix

4.) The best time to exclude bats from your home is?

A.) late fall
B.) early spring
C.) late summer
D.) third Tuesday in March

5.) The diet of Pennsylvania's bats classifies them as:

A.) frugivorous
B.) insectivorous
C.) sanguivorous
D.) carvivorous

6.) According to fossil records, how many years have bats existed on Earth?

A.) 50,000
B.) 50,000,000
C.) 5,000,000,000
D.) 500,000

7.) Which of the following may be done to a bat box to help attract excluded bats?

A.) insect remains from a bug zapper are soaked in water and poured over bat box
B.) a mixture of molasses, sugar and water is poured over the outside of bat box
C.) bat droppings and water are mixed and poured over the inside of bat box
D.) bat iguana and water are mixed and poured over the inside of bat box

8.) Which species of bat is the most common in Pennsylvania?

A.) red bat
B.) big brown bat
C.) little brown bat
D.) common brown bat

9.) Bats may live an average of how many years?

A.) 30
B.) 5
C.) 55
D.) 12

10.) Which of the following will help the future of Pennsylvania's bats?

A.) arresting people for killing bats
B.) breeding bats in zoos
C.) dispelling myths and folklore
D.) licensing more bat rehabilitators

11.) If you are bitten by a bat or any animal you should:

A.) place a band-aid over the bite
B.) never tell anyone you were bitten; they might get mad at you
C.) wait two weeks, then tell your best friend
D.) tell a wildlife or health authority

12.) Pennsylvania's bats typically have how many young per year?

A.) 3-5
B.) only 1
C.) 1-2
D.) more than 6

13.) Which of the following is NOT found in Pennsylvania?

A.) red bat
B.) horseshoe bat
C.) silver haired bat
D.) hoary bat

14.) Which of the following is the diet bats feed their young?

A.) insects caught by both parents
B.) regurgitated insects
C.) milk produced by the mother bat
D.) small birds and mammals brought by the father bat

15.) When do bats mate?

A.) early spring
B.) summer
C.) late fall
D.) during full moons

16.) Canoe Creek State Park is the site of one of Pennsylvania's largest maternity colonies of little brown bats. The colony is found in:

A.) a cave
B.) an abandoned mine
C.) a deserted church
D.) a dead tree

17.) When trying to move a colony out of your home, the ideal time to erect a bat box is?

A.) same day the hole is plugged
B.) the year after exclusion
C.) during winter when bats are gone
D.) summer before exclusion

18.) Which of the following is used to temporarily capture bats for scientific data collection?

A.) cannon nets
B.) fish nets
C.) mist nets
D.) butterfly nets

19.) Newborn bats attach themselves to their mother's teat by?

A.) imbedding their thumb hooks into her skin
B.) wrapping their wings around her body
C.) using their egg tooth to hold on
D.) using hooked baby teeth to grasp teat

20.) Young Pennsylvania bats begin flying at:

A.) one to two years of age
B.) four to five years of age
C.) one to two weeks of age
D.) four to five weeks of age

BAT TEST ANSWER KEY

1.) C
2.) D
3.) B
4.) A
5.) B
6.) B
7.) C
8.) C
9.) A
10.) C
11.) D
12.) C
13.) B
14.) C
15.) C
16.) C
17.) D
18.) C
19.) D
20.) D

BASIC BAT TEST ANSWER KEY

MULTIPLE CHOICE

1.) B
2.) C
3.) D
4.) B
5.) A
6.) C
7.) C
8.) A
9.) D
10.) D

TRUE & FALSE

1.) F
2.) T
3.) T
4.) F
5.) F
6.) T
7.) F
8.) F
9.) T
10.) F

Pass the Torch of Knowledge Certificate

The objectives of this activity are as follows:

1. **Student mastery of basic information concerning bats**
   - A. Biology
   - B. Natural history
   - C. Current/past myths
   - D. Appropriate human reaction to human/bat interactions
   - E. Bat needs for continued survival
   - F. How humans can help
     1. Teaching others
     2. Wise use of resources
     3. Erecting bat boxes

2. **Student teaching others**
   - A. Feels good about new-found knowledge
   - B. Wants to share information
   - C. Sees him/herself as important to future survival of bats

3. **Class discussion after seeing "Season of the Bat" might involve:**
   - A. Unusual facts
   - B. Important points
   - C. Needs of bats for continued survival
   - D. How they can help

4. **Introduction of Pass the Torch of Knowledge Certificate**
   - A. Select three important facts to teach an adult
   - B. Have adult list three facts learned
   - C. Have adult sign the certificate
   - D. Bring to teacher for check-off

Class Bat Box Project

1. The purpose of this activity is to demonstrate to students the following concepts:
   A. Bat housing requirements are simple but very specific
   B. Location is crucial
   C. They can help bats
      1. More bats = fewer insects
      2. Fewer insects = less insecticide use
      3. Less insecticide use = less environmental toxins
   D. Community involvement is beneficial and necessary

2. This approach may prove the most simple

   A. Teacher asks for volunteers for each of the following teams
      1. Finance — could be combined
      2. Purchasing
      3. Construction — could be combined
      4. Location selection — could be combined
      5. Installation
      6. Monitoring — could be combined
      7. Publicity

   B. Finance team must secure the money for construction/purchase (only if no one is available to build it) of bat box through:
      1. Donation of materials
      2. Solicitation for donations
      3. Class fund-raiser - bake sale, car wash etc.

   C. Purchasing team is responsible for checking prices for the materials list, finding the most economical deal and purchasing the needed components

   D. Construction team needs a volunteer adult to construct or supervise construction of the bat box. The plans should be followed exactly

   E. Location selection team has the most difficult and crucial task. No matter how beautifully made your bat box is, it will not be occupied if placed in the wrong location! Suggestions for choosing proper location:
      1. Good location information is contained in the spring 1993 issue of Bats, a magazine published by Bat Conservation International (BCI), P.O. Box 162603, Austin, TX 78716-2603. The following information is taken from that article:
         a. 78 % of occupied bat boxes are 1/4 mile or less from streams or rivers (source of insects)
         b. Bats exhibited a preference for boxes in agricultural areas
      2. Lisa Williams-Whitmer of Penn State has done much research on what makes bat boxes attract bats. Her plans and directions are enclosed with the Bat Booster Program
      3. A location that already has bats is likely to be more successful than one that does not

F. The installation team must have adult volunteers to help them. This is not only helpful to students, but furthers community involvment and understanding

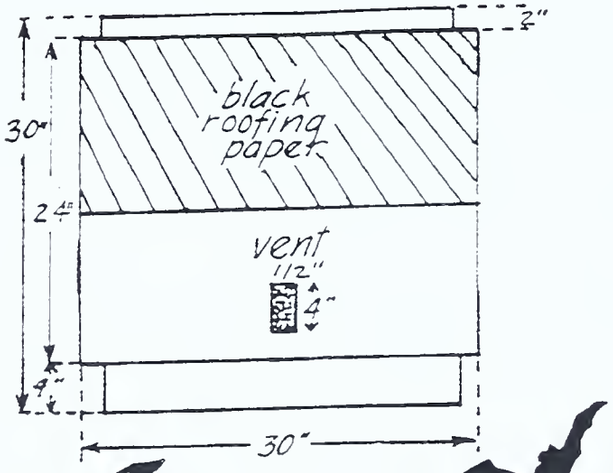
G. The monitoring team must check boxes in spring for presence of resident bats

H. The publicity team seeks local publicity for the class project. This will further community interest and ultimately benefit local bat populations

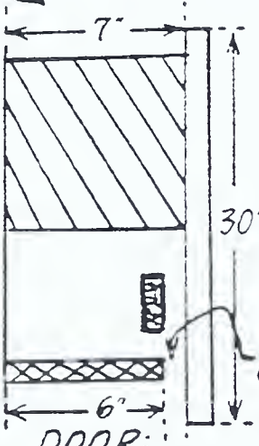
I. Teacher revival team: This may be needed after successful completion of this project. Short of a week in the Bahamas, a quiet dinner for two may be necessary! At the least, we say, "Well done, teacher! The bats will always love you!"

PENNSYLVANIA BAT BOX, PENN STATE UNIVERSITY & PA GAME COMMISSION

FRONT



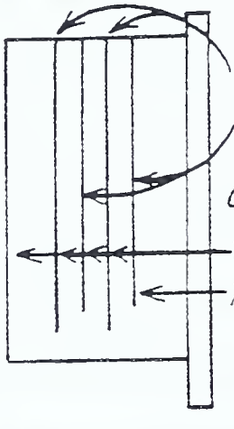
SIDE



ENTRY CRACK 1" wide

DOOR: plastic netting 1/4" diam. mesh

SIDE (CUTAWAY)



BAFFLES:
2: 1/4" x 22" long
2: 1/4" x 21" long

CREVICE WIDTHS:
1" first 4 crevices
1 1/2" rear crevice

CAPACITY: 150-200 BATS

ORIENT BOX TO SE or SW. NEEDS 6 HRS. IN SUN IN AM & PM. ORIENT TO GET + SUN N of PA; - SUN S of PA

ATTACH BOX AT LEAST 10' HIGH ON POLE or BLDG.

MATERIALS: *do NOT use wood glue for any part of this project!!*

- 3/4" BOARD OR EXTERIOR GRADE PLYWOOD for FRONT, BACK & SIDES
- 3/4" BOARD OR 1/2"-3/4" EXTERIOR PLYWOOD FOR ROOF
- 1/4" LIGHT PLYWOOD FOR INTERIOR BAFFLES
- LATEX SILICONIZED CAULK • BLACK ROOFING PAPER
- LATEX PAINT OR STAIN - DARK BROWN
- EXTERIOR GRADE DECK SCREWS • GALVANIZED FINISHING NAILS

ASSEMBLY:

1. CUT OUT PIECES. CUT VENTS in FRONT & SIDES USING JIGSAW
2. USING KNIFE OR SAW, ROUGHEN ALL INTERIOR SURFACES w/ HORIZONTAL SCRATCHES: 1/4"-1/2" APART FOR BATS TO CLING TO. PAY SPECIAL ATTENTION TO LANDING BOARD AT BOTTOM OF BOX
3. ATTACH FRONT TO SIDES w/ DECK SCREWS; CAULK SEAMS
4. ATTACH ROOF (slant to promote water runoff) TO SIDES & FRONT w/ DECK SCREWS; CAULK SEAMS
5. INSTALL 2: 1"x1"x22" INTERIOR SPACER STRIPS ON INSIDE OF FRONT PIECE w/ FINISHING NAILS. MAKE SURE STRIPS FIT SNUG AGAINST SIDE PIECES.
6. ATTACH 1ST 1/4" x 28 1/2" x 22" BAFFLE TO SPACER STRIP w/ FINISHING NAILS.
7. INSTALL 2, 1"x1"x22" INTERIOR SPACER STRIPS ON BAFFLE & UP AGAINST SIDES OF BOX w/ FINISHING NAILS.
8. ATTACH 1/4"x28 1/2"x21" BAFFLE TO SPACER STRIPS w/ FINISHING NAILS.
9. INSTALL 2, 1"x1"x22" INTERIOR SPACER STRIPS ON PRECEEDING BAFFLE, BE SURE SPACER STRIPS FIT SNUGLY AGAINST SIDES
10. ATTACH 1/4"x28 1/2"x22" BAFFLE TO SPACER STRIPS
11. INSTALL 2, 1"x1"x22" INTERIOR SPACER STRIPS ON BAFFLE & UP AGAINST SIDES OF BOX w/ FINISHING NAILS.
12. ATTACH 1/4"x28 1/2"x21" BAFFLE TO SPACER STRIPS w/ FINISHING NAILS
13. ATTACH BACK OF BOX TO ROOF & SIDES. CAULK SEAMS.
14. PAINT/STAIN EXTERIOR w/ LATEX BASED STAIN. DO NOT STAIN INTERIOR
15. ATTACH ROOF PAPER TO ROOF. CAULK SEAM WHERE ROOF MEETS BACK PANEL
16. TACK ROOF PAPER TO FRONT & SIDES; EXTEND 12" DOWN FROM TOP. THIS (this is very important!) CREATES A TEMPERATURE GRADIENT FROM TOP TO BOTTOM OF BOX.
17. TACK PLASTIC MESH: BOTTOM OF BOX: LEAVE 1" CRACK FOR BATS TO ENTER

INSTALLATION:

1. INSTALL BOX BEFORE (SEASON) COLONY TO BE EVICTED
2. DO NOT PLACE IN AN AREA WHERE DROPPINGS WILL BE A NUISANCE

MAINTENANCE:

1. DO NOT DISTURB: BATS ARE PRESENT. INSPECT WINTER: REPAIR
2. FALL/WINTER: REMOVE WASPS NEST w/ STICK - NO SPRAYS

TOOLS REQUIRED:

- CIRCULAR SAW
- JIG SAW
- DRILL
- SCREWDRIVER.

★ ALL

THIS WAS DESIGNED BY LISA WILLIAMS: home: 814-364-2344 work: 814-865-2130

HANDS OFF

This should be read to students when begining the project

Never pick up a bat with your hands. Bats can become sick or injured just like people and other animals. To understand a bat's reaction to you, imagine something 10 to 16 times larger than you, racing to pick you up! Even though you may intend to help the bat, it doesn't know what you are thinking. Talking to the bat won't help either, because it doesn't speak Englisn, Spanish or Chinese - it speaks bat! It may bite you in self-defense because it is afraid. Call an adult. Instruct them to place a small plastic container over the bat. Then, slowly and very carefully slide a piece of lightweight cardboard under the plastic container. Then, keeping the cardboard pressed tightly to the container, carry it to a tree. Place the container in a position that will allow the bat to exit, then remove the cardboard and leave. Have an adult check the tree the following day. If the bat is still there, call a licensed wildlife rehabilitator. Their telephone numbers are available from the Pennsylvania Game Commission's local offices.

VAMPIRES

Even though vampire bats are not residents of North America, it is necessary to address the fear-based misconceptions about this particular species of tropical New World bat. Fear germinated by ignorance of the factual behavior of this species, has pronounced a death sentence on bats in general. For this reason, we suggest illumination of these shadows as a beginning to the Bat Booster Project. This need not be a lengthy endeavor. A simple beginning could be as follows:

1. Research on vampire bats
    A. Myths
    B. Facts
2. Oral reports
    A. Individual students giving their own
    B. Groups of students work together

An alternative approach is teacher generated information given to students. A short (3 pages), well-written, life history is presented in Klaus Richarz and Alfred Limbrunner's The World of Bats, The Flying Goblins of the Night, T.F.H. Publications, Inc., Neptune City, N.J. 1993

A few of the more interesting facts presented therein are:

-The three species of Vampire Bats are found only in Central and South America
-Three and one half inches is the maximum length of the vampire bat
-Gestation period is seven months
-Because the chemical transition is difficult, the young nurse for nine months
-Unlike other bats, orphaned young are adopted by pupless females. Adoption induces lactation
-Blood, their sole diet, is licked not sucked (their are human cultures in Africa which consume cattle blood)
-Bats consume about eight teaspoons equaling 132 % of body weight nightly
-Vampires could not exist in temperate zones because energy required for digestion of blood and body warming would require twice as much blood
-Vampire populations were small before the advent of cattle ranching because of a limited food supply
-Cattle ranching has provided an inexhaustible supply of large, slow moving food for vampire bats
-Research on vampire bats has yielded an anticoagulant for humans. The new drug is called Draculin

Question: How has our enjoyment of fast food benefitted vampire bats?

Facts Concerning Bats and Disease

Once again, it is necessary to sweep aside myths clouding the facts as they relate to bats. Current research indicates only two diseases can be transmitted from bats to humans. They are rabies and histoplasmosis.

Histoplasmosis is caused by a fungus which may or may not be present in bat droppings. Infection in humans occurs when they breathe spores stirred up by movement of infected bat guano (feces). The primary source of human infection by histoplasmosis is bird droppings.

Just as it can infect any warm-blooded mammal, rabies can also be contracted by bats. Because of the myths associated with bats, we react more emotionally to the transmission of rabies by a bat to a human. Media reports may hype the occurrence simply because it is so unusual. Less than one half of one percent of bats contract rabies. Rabid bats, unlike rabid cats or dogs, seldom become aggressive. Each year, 10 people in the United States die from dog attacks. Just as we exercise caution in dealing with unfamiliar dogs and cats, we must exercise caution in dealing with any wild animal, including a bat.

It is important to reinforce this concept with students who may fail to exercise caution with their new-found enthusiasm for bats. No one should ever touch a bat. It is not only foolish; it is unnecessary.

Should you wish to read more about bats and rabies, America's Neighborhood Bats. by Dr. Merlin Tuttle, has excellent information on the subject.

WILDLIFE PETS

As you know, when children like something, they may wish to have one of their own. Movies such as Rascal and Flipper, aided by books like The Yearling, Hawk, You're My Brother, and A Bat in My Pocket , promote the "up close and personal" relationship with wild creatures. We hope you will discourage these attitudes. Here are some reasons you may wish to consider in making your case for wildlife to remain just that : Wild and Alive.

1. Legal issue
   - A. Pennsylvania law prohibits the taking of any animals or birds from the wild for the purpose of pet keeping
   - B. After extensive training and administration of examinations, people may become licensed to care for injured wildlife
   - C. Pennsylvania Licensed Wildlife Rehabilitators must return animals to the wild after they have recovered
2. Moral issue
   - A. It is unfair to the animal - we often explain this to students by saying: "What if your parents loved you so much, they never let you out of your room?" The animal becomes our prisoner:
   - B. Humans are unable to provide for all the needs of wildlife
     1. Normal wild foods
     2. Normal "wild house"
     3. Association with members of their own kind and other wildlife
     4. Mating and raising young
3. Safety issue
   - A. There are many diseases which people can contract from direct contact with wildlife
   - B. Animals almost always die in the hands of well meaning "rescuers"
     1. People fail to provide both the proper nutrition and caloric intake
     2. People not trained to recognize physical debilitation of wildlife nearly always underestimate the seriousness of the animal's condition
   - C. Any wildlife which is able to be caught is seriously in need of the professional care of a licensed wildlife rehabilitator, whose phone number can be obtained by calling the Pennsylvania Game Commission

Bats fit into this picture! No matter how appealing, they must never be touched directly by children, or anyone else.

CLASS PROJECTS

Writing and performing songs for other classes

Rap music

The current popularity of "rap" music lends itself nicely to the Bat Booster Program. Rap allows merging of learned ideas with music, rhythm, and lyrics.

Possible rap presentation could be performed for the class, other classes, or as an assembly, on Earth Day using information gained from the Bat Booster Program as the subject area.

1. Individual approach

    A. Students write their own music and lyrics
    B. Students set their lyrics to a current rap song beat/melody

2. Class approach

    A. Music composition or selection team
    B. Lyrics composition team
    C. Performer
        1. Sing the song
        2. Choose their rap group name
    D. Choreography team
        1. Designs dance steps to accompany song
        2. Teaches performers the routine
    E. Costume team
    F. Program team
        1. Designs programs
            a. Lists performers
            b. Incorporates printed lyrics
            c. Develops graphic presentation of program
        2. Produces programs
            a. Photocopy
            b. Block printing
    G. Production team
        1. Coordinates all phases
        2. Directs actual production
        3. Selects a host for introduction of program

Example song: performed by - Benny Big Brown and the Cave Dwellers.

I'm tellin' you folks
that it's a sin
the very bad state
my reputation is in!

I don't like hair
its the bugs I eat
buzzin' your doo'
man what a treat!

Hey, i'm not dirty
my fur just gleams
from washin' all night
while you're havin' dreams!

I need to live, brother,
just like you
you don't need a bug zapper
with a bat work crew

Rap could be replaced by folk or popular type of music/song at the pleasure of the teacher or students.

Language Arts

Obviously, many language arts opportunities are present in the Bat Booster Program. The following are offered for your consideration:

1. Poetry:
   A. Traditional verse
   B. Haiku - Japanese form of poetry with three unrhymed lines of 5,7,5 syllables.

      Example: bats buzz in the night
      turning, climbing, zooming down
      bats fly full of bugs

2. Creative writing
   A. Bat fable which dispels a myth
   B. Interview with a bat
   C. Autobiography of a bat
      1. Common bat
      2. Endangered bat
      3. Bat grounded by human hostility
   D. Short stories

3. Crossword puzzles
   A. Names of bats
      1. Common
      2. Scientific
   B. Terminology relating to bats

4. Word finds

5. Research - cooperative groups create visual aids, written and oral reports for other groups
   A. Nutrition
   B. Habitat
   C. Behavior
   D. Physical characteristics

6. Vocabulary log
   A. Keep a list of all unfamiliar words
   B. Define and use in at least a six word sentence

Writing and performing a play for younger students about human/bat encounters that displays proper response to a bat in the house. This could be presented on Earth Day.

Possible play scenario:

1. Scene:
   - A. Family birthday party
   - B. Dining room/living room
   - C. Late spring night
     1. Windows open, screens not up yet
     2. Bugs and moths flying in toward lights

2. Cast:
   - A. Family members: bat-smart student, brother (younger) sister (older), mother, father, grandparents, aunts, uncles friends, etc.
   - B. Neighbors
   - C. Responding officials: police, fire, animal control

3. Story:
   - A. Family celebration
   - B. Bat flies in chasing a moth
   - C. Display of various responses by cast
     1. Mild fear: mother
     2. Hysteria: grandmother
     3. Calm observation: grandfather.
     4. Exaggerated resolution: father calling 911
     5. Humor: younger brother.
     6. Boredom: older sister.
     7. Unnecessary force: authorities.
     8. Proper response: student who saw "Season of the Bat" video.
   - D. Conclusion of a most unusual birthday party.

4. Most common responses to bats in the house:

   - A. Unjustifiable fear translates to hysteria
   - B. Attempts to kill the "evil" bat utilizing tennis, racquetball or badminton rackets, brooms and baseball bats
   - C. Calling 911 asking for assistance from police and fire personnel

5. Actual reasons for bat(s) presence in the house:

   - A. Bats may reside in attic of house and entered main house area via a hole or under attic door or crack in wall or ceiling.
   - B. Bats may reside behind shutters, siding, soffit or fascia of house and entered through an open door, window or torn screen.
   - C. Usually, bat is in pursuit of an insect; then, having followed its food inside, finds itself trapped within a home.

6. Proper response to bat(s) in the house:

   A. Do not panic.
   B. The bat simply wants out and is not there to harm you. Open windows and doors. If possible, isolate bat from the rest of the house in a room with a window or outside door that can be opened; sit quietly and watch the bat to ensure that it has flown out .
   C. Bat(s) may tire and choose to land, usually on curtains or a picture frame. Using a margarine tub or similar container, place over the bat and carefully slide a piece of cardboard or the back of a tablet between the curtain and the tub, trapping the bat inside. Take container outside and open carefully on a tree, allowing bat to climb out of the container onto the bark of the tree. Although bats are capable of taking off from the ground, it may be exhausted and stressed from being removed from the house and could have trouble lifting off. When bats are on the ground they are vulnerable to predation, so placing them in a tree is best. Always call an adult to help and never attempt anything without gloves.

7. The development of this activity may be simple

   A. Teacher asks for volunteers or assigns following:
      1. Script writing team
      2. Acting team
      3. Prop/set design team
         a. props: rubber bat, birthday cake, tennis rackets, etc
      4. Directorial team
      5. Production team
      6. Makeup/costume selection team
      7. Publicity team
      8. Program team
   B. Students perform play for another class

Designing and making bat flags for display

This could be a popular project in light of the new flag rage. Each child could choose one of Pennsylvania's nine species of bats, then design and construct a flag displaying their bat. Flags could be made in a variety of ways.

1. Flag construction

    A. Possible flag materials
        1. White pillow cases attached to a 3/4" diameter dowel rod.
        2. Colored burlap ($1.80 per yard - 36" wide)
        3. Muslin ($1.70 per yard - 38" wide - would need to be hemmed)

    B. Possible mediums for bat design
        1. Drawn on felt, cut out, and glued on the flag. (felt $2.50 per yard - 36" wide or $4.50 per yard - 72" wide,)
        2. Draw directly on the flag with one of the following products:
            a. Pentel fabric fun $1.95 box of 15 colors
            b. Crayola fabric crayons $2.95 box of 8 colors
            c. Palmer fabric paint $4.20 box of 6 colors
            d. Niji fabricolor superfine markers $1.50 each
        3. Publicity is good for students, school and bats
            a. School paper
            b. Local paper
            c. Local media - radio and television

*NOTE - all prices are subject to change. Prices taken from Dick Blick Art Materials Catalogue, 800-447-8192

2. Flag display

    A. In school
        1. Classroom
        2. Auditorium
        3. Library
        4. Gymnasium
        5. Cafeteria
        6. Halls
    B. At an Earth Day celebration
        1. Outside building, attached to poles stuck in ground
        2. A parade of flags
    C. In places of business
    D. In government buildings

Designing, building and flying bat kites for younger students

The designing and making of bat kites is limited only by one's imagination. While researching proper construction of kites, it was learned a long and colorful history accompanies the practice of kite construction and flying. Bat kite construction can provide a melding of aerodynamics, art, and natural history. Therefore, it is suggested this opportunity for learning not be overlooked.

1. Research
   - A. The students are assigned library research on kites. The groups could be divided as follows:
     1. History of kites
     2. Scientific uses of kites
     3. Various construction methods
     4. Variety of kite forms
   - B. Students select subject area (from above) and individually research

2. Presentation of research
   - A. Each group reads their paper to class
   - B. Each student takes notes

3. Construction
   - A. Each student designs his/her kite *
     1. Decides form (box, traditional, etc.)
     2. Decides materials
     3. Plans decoration/art work on kite
   - B. Each student constructs his/her kite
     1. Construction in school
     2. Construction at home
        - a. Involves family
        - b. Leads to completion of "Pass the Torch of Knowledge" certificate

4. Presentation and Flying of kites:
   - A. When project is due
   - B. On "Kite Day" **
   - C. On Earth Day

*Ideas:

- A. Specific Pennsylvania bats with or without attached bat pups
- B. White bat skeletons painted or drawn on black tissue paper or plastic
- C. Bats hibernating in a cave
- D. Bats migrating
- E. Imaginary super bats
- F. Human activity with bats
- G. Box kite simulating a bat box with resident bats

**Kite Day:

Historically, May 5th was Kite Day in China and all gathered to participate in the festival. The beauty and variety of the kites flown was astonishing. Resurrection of such a festival for students would be great fun. Awards could be given for the fastest, the highest flying, the prettiest, the most original and the most factual. The younger children could enjoy watching the spectacle as a treat. This project could be tied into Earth Day, calling attention to the importance of bats.

Class mural depicting carnivorous, piscivorous, sanguivorous, insectivorous, frugivorous, and nectivorous bats in action.

Definitions:

1.) Carnivorous = meat or flesh eating.
2.) Frugivorous = fruit eating.
3.) Insectivorous = insect eating.
4.) Nectivorous = nectar drinking.
5.) Piscivorous = fish eating.
6.) Sangivorous = blood licking.

1. Decide mural theme with class vote

   A. Many myths, legends, fairy tales and misconceptions exist with regard to bats. Depict as many as possible.
   B. Bats are flying mammals which give birth to live young, typically 1-2, which are fed milk produced by the mother bat. Show a Pennsylvania nursery colony in a barn, attic, cave etc.
   C. Draw and label body parts of a typical Pennsylvania bat.
   D. List and illustrate bat species found in Pennsylvania.
   E. Show examples of the types of prey items consumed by Pennsylvania's nine species of insectivorous bats.
   F. Show roosting and hibernating sites for Pennsylvania's bats. Example: Which bats use trees, houses, churches, barns and caves.
   G. Echolocation is a very sophisticated system of navigation and food location utilized by many species of bats. Depict its use by Pennsylvania bats.
   H. Bats have the capability of regulating heart and metabolic rates drastically to aiding survival. Show a bat's yearly activities and related heart rates. Example: Bat resting, feeding young, hunting in summer, migrating and hibernating in fall and winter.
   I. List and present the types of bats based on food source and food location. Show differences in physical characteristics. Present these differences.
   J. Bats have evolved many different food procuring strategies resulting in a wide range of food sources, habitats and physical characteristics. Graphically portray these activities.
   K. Many ecosystems depend upon bats for survival. These include deserts and rain forests. Show the activities of these bats and the results. Example: Seed dispersal by frugivorous bats; pollination by nectivorous bats.
   L. Display the difference between echolocating and non-echolocating bats by their anatomy. Example: small eyes and presence of tragus for echolocation; large eyes and no tragus for non-echlocating bats.
   M. Illustrate environmental issues concerning bats, i.e. vampire bats.

2. Select site

3. Choose method and materials

4. Assign or have volunteers for each object to be painted

Producing a class art show using pen and ink, acrylics, water colors, clay sculpture, papier-mache, jewelry, etc., depicting bats or bat designs for display within the school or at a local bank or library

Producing a class art show:

As with any class project, this may be as simple or complex as time permits. It may involve only the expression of the children's artistic creations with regard to bats. Or, at its most developed, the class art show can include many skill areas and significant class time.

1. Basic Art Show

   A. The teacher contacts a local bank or library and receives permission to display class art projects during a specific time period in an area within the building. This is a good public relations tool for banks and will usually be welcomed by them. If local banks are unwilling, try libraries, colleges, government offices, court houses, utility companies, malls, or other businesses.

   B. Once location and date are selected, the methods of display should be chosen, as these will affect the range of art forms which are offered to the children. Example: If only display boards are available, sculpture would not be appropriate.

   C. With this information in hand, the art teacher should be consulted for mediums available at your school and the time periods required to use them.

   D. Room mothers/fathers can assist in scheduling parents to help with transport and setup of the finished art.

   C. Having completed the logistics, the basic class art show can be scheduled and executed.

   E. A notice should be sent home to school parents encouraging their visitation of the art show.

   F. Local news media should be notified and encouraged to "cover" the event.

CONTINUED.....!

2. Specialized art show

-Papier-mache bat masks for Halloween or "Mardi gras".
-"Batty about bats" valentines.
-Bat boxes with "art" by woodburning the outside with bat designs.
-Bat jewelry made with "Fimo polymer clay" or Scupley modeling compound, or "wood shapes necklaces". (72 pk necks. for $23.90-Dick Blick- #60060000)
-Block printing - could be scarves or neckties for parents.
-Carving on balsa foam.
-Scratchboard.
-Detailed silhouettes cut from black construction paper depicting bats, bat activities, bat myths - (these myths could be presented in October with each accompanied by a bat fact in any form).
-Inflatable sculptures (mylar balloons).
-String art.
-Shrink art sun-catchers.
-Batik prints.
-Bat clay pottery.
-Bat mobiles depicting the nine Pennsylvania bat species.

Additional fund-raising ideas:

In the case of black-and-white art, (such as pen and ink drawings, block prints, or silhouettes mounted on white paper) 12 pieces could be selected to produce a 12 month calender on 8 1/2" by 11" paper, using a good copier for reproductions. Seven sheets folded in half and stapled could form the calendar. Each month features selected art work, bat facts and important school dates.

Cost, from local printer: 100 folded and stapled calendars - about $105.00.
Dick Blick Art Materials Catalogue available by calling 800-447-8192.

Class teams which will research, write, illustrate and compile a class field guide to Pennsylvania's bats

1. Research Team:

Since the information gathered by this group will be utilized by each of the other teams, the needs of each group should be known before the research is begun. Gathering of information must be very thorough, as it is easier to eliminate material than to return and search for more. Research team will require a decent library from which to draw the necessary information. If your school's library is not sufficient, your local public library or one at a nearby college or university may be accessed. The best sources of bat information may be available from the Pennsylvania Game Commission's Office of Information and Education, or through Bat Conservation International (BCI). This team should have little difficulty acquiring information necessary for completion of this project.

The information should include the common and scientific names of each species of bat, as well as the natural history and a physical description, along with any other relevant information. The final material should be concise, well organized and easily accessed.

A. Collect natural history:

1. Roosting preference - barns, attics, cavities, or are they open canopy dwellers? Colonial or solitary?

2. Food - types of insects consumed and amount of food consumed per bat

3. Hunting preference - open fields, deep forest, near water

4. Unique or peculiar characteristics or habits

5. Local hibernators or are they migrators

6. Population status - endangered, threatened, etc.

B. Record physical description:

This segment is very important for the art team as they will utilize this information to aid them in the illustrations. It will be found primarily in field guides.

1. Measurements - wing span, forearm, tail, body, ears and feet. Tragus descriptions - blunt, rounded, or pointed. Is calcar keeled?

2. Coloration - face, ears, wings, body, feet, tail and fur

3. Fur - placement, length and density

C. Compile bibliography sources

D. Present to Compilation Team

2. Writing Team:

This team must work closely with the research group, as they must depend on them for thoroughly investigated, accurate facts from which to produce the accompanying text.

A. Receive research information

B. Establish an order of information

1. Natural history
2. Diet
3. Physical description
4. Behavior
    a. Roosting site
    b. Migration activities

C. Organize Research Teams information into the chosen format

D. Present finished text to Compilation Team

3. Illustration Team:

This phase of the field guide may be the most important due to the visual nature of our society. Gathering field guides, bat literature and the slide show available from BCI, and/or other materials, is essential for this group to accurately portray each species of bat. Utilizing live bats from which to draw is unwise, so photos will be important for this team.

The following are decisions which must be made in order for the illustrative team to form a plan of action

A. Number of copies:

1. Single copy; bats drawn directly on pages
    a. Colored pencils (Berol brand blends well)
    b. Watercolor (cheaper, but messy)
    c. Pen and ink
2. Multiple copies:
    a. Method of duplication
    b. Black and white reproduction
        1. Pen and ink
        2. Coloring book format
    c. Color reproduction (Cannon color copier at local printer, or other business)
        1. Very accurate reproduction
        2. Relatively expensive (approx. $2.00 per 8 1/2 X 11 copy)

B. Format from Compilation Team

1. Space available for each illustration:
    a. To scale
    b. Actual size
2. Paper to be utilized

C. Present final art work to Compilation Team

4. **Compilation Team:**

Members of this team will have the responsibility for creation of the finished product, which will reflect upon each member of all the teams involved. This group must decide:

A. Paper:
1. Size
2. Glossy or matte
3. Weight of paper

B. Cover stock:
1. Color
2. Weight of paper

C. Format
1. Text
    a. Size (point of type)
    b. Style
    c. Placement
2. Illustrations
    a. Space alloted
    b. Placement
3. Table of contents
4. Page numbers
5. Bibliography

D. Method of duplication

E. Method of assembly

F. Cost
1. Total
2. Per book

5. **Marketing Team:**

A. Establish selling price of each book - profit margin

B. Market - school or local community

C. Publicity for sale of books
1. In school
2. Local media

D. Method of payment to creditors

Designing a bat T-shirt for sale. This would require a bake/candy sale to earn the money for initial purchase of shirts. Additionally, a management team, finance team, design team, production team and a sales team would have to be established.

1. Management Team: This team leads the project by
   A. Overseeing every phase
   B. Coordinating decisions made by entire class
   C. Establishing and monitoring deadlines for production
   D. Disbursing profits from finance team
   E. Reporting to entire class

2. Finance Team: Several decisions must be made by this team before any production is undertaken
   A. Money available to pay for shirts and printing
   B. Prices from local screen printers of shirts
   C. Number of shirts to be produced
   D. Sale price of T-shirts:
      1. Break even: production cost equals sale price
      2. Charge enough for shirts sold outside class to cover all or part of cost for participating students' shirts
      3. Sell shirts at a price that allows class to donate profits to an organization actively involved in some phase of bat conservation

3. Design Team: Success of the entire project may rest with this group
   A. Identify "target population," or to whom the shirt will be sold, by working with the sales team:
      1. Outside school
      2. Within school
      3. Both of the above
   B. Produce several designs based on target group *
   C. Entire class votes on which design(s) will be used
   D. Produce camera-ready design

*Suggestion: The design should depict bats in a manner that is factual and realistic

4. Production Team: This team must narrow T-shirt choices for the following:
   A. Style
   B. Size
   C. Color
   D. Color of ink
   E. Acquire several estimates for cost of production
   F. Present estimates to finance team

CONTINUED....!

5. **Sales Team:** This is a difficult aspect of T-shirt project. This team must decide the following:
   A. To whom will shirt be sold (by working with the design team)
      1. In-school sales
      2. School plus the general public
   B. How will shirt be sold.
      1. Pre-pay with each order to eliminate excess inventory
      2. Shirts already printed, pay when you buy
   C. When will shirts be sold
      1. Shirt sale/order period
      2. Bat festival
      3. Kite day
      4. Earth Day
   D. How records will be kept
   E. Where will money be kept - bank account, teacher, student
   F. Give final report and funds to management team

NOTE: For a simple T-shirt project:
   A. Each child brings in a plain T-shirt. New is preferable , but not necessary.
   B. Each child cuts a bat-related design on a block-print board. Or, finances lacking, a potato block print can be used.
   C. Each child prints his/her own shirt.
   D. Children wear their shirts on Bat Day or Earth Day, etc.

Teacher / class opinion survey

1. Total number of students participating in your Bat Booster Program _____

2. Number of students liking "Season of the Bat" _____

   Number of students disliking "Season of the Bat" _____

3. Teacher's opinion: liked or disliked, "Season of the Bat" _____

4. Teacher's overall reaction to Bat Booster Program

   very poor poor mediocre good excellent

5. Students overall reaction to Bat Booster Program (please give numbers)

   very poor poor mediocre good excellent

6. Teacher's opinion in order of importance (1 equaling most important and 4 the least)

   A. Pass the torch of knowledge _____
   B. Poster _____
   C. Bat booster book mark _____
   D. Bat booster button _____

7. Which activity from the activity guide did you choose?_____
   Why?_____

8. Suggestions (please use additional sheets)

Grade level:_____
Name:_____
School:_____
Address:_____

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TO ORDER STUDENT AWARDS, PLEASE FILL IN HOW MANY OF EACH NEEDED:

_____Pass The Torch Certificates
_____Bat Booster Book Mark
_____Bat Booster Button
_____Bat Poster